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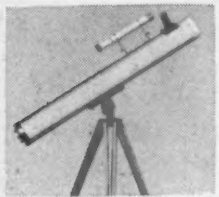

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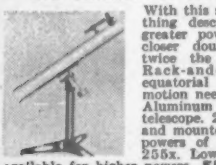

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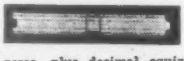

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BIOCHEMISTRY

Shortened ACTH Molecule

A peptide molecule that may lead to synthetic medical products has been synthesized. Clinical tests of its biological activity in humans are now being made.

➤ A BIOLOGICALLY active peptide molecule that is identical to the first 19 amino acids of the ACTH molecule (a natural hormone used in treating arthritis) has been synthesized.

The achievement may lead to a series of synthetic medical products, each having only one of the many biological effects of natural ACTH. Undesirable side effects of the hormone may be eliminated by this modification technique.

Synthesis of the new molecule was reported in the Journal of the American Chemical Society by a research team from the University of California School of Medicine's Hormone Research Laboratory. Dr. C. H. Li, director of the laboratory, heads the team.

Probably the largest polypeptide ever synthesized, the new molecule has been found, in experimental animals, to have one-third the potency of natural ACTH obtained from the anterior lobe of the pituitary gland. Clinical tests are now being made of its biological activity in humans.

The first isolation and structural identification of ACTH from sheep and cattle pituitary glands was achieved several years ago by Dr. Li and his co-workers. The entire ACTH molecule consists of 39 amino acids in the form of a straight chain.

Since ACTH was first shown to be clinically effective against such diseases as rheumatoid arthritis, there have been indications that not all 39 amino acids are necessary to the biological activity of the protein hormone. Much recent work has been aimed at reducing the complete molecule to the basic structure or core that is responsible for its biological activity.

The new synthetic molecule is identical in every respect to the corresponding portion of the natural ACTH peptide. This means that each of the 19 functional groups appears in its free state and is not modified by other chemical groups.

This is probably the most difficult feature of the synthesis of natural molecules, since in the process of joining structural groups together, it is necessary to render a large number of structural "sites" chemically inert so that undesired reactions do not take place.

Finally, for the synthetic molecules to appear in the free state, all the protected functional groups must be unblocked, so that they once again appear as they do in the natural molecule, ready to react with various chemical agents.

• Science News Letter, 78:355 December 3, 1960

METEOROLOGY

Lag in Weather Research

➤ WEATHER RESEARCH on the earth's surface is falling behind satellite weather research.

Albert K. Showalter, chief of the U. S. Weather Bureau's observations and station facility division, reported that more investigations of the lower layers of the atmosphere should be made and correlated with information available from such weather satellites as Tiros.

He said that there is now more information about the higher layers of the atmosphere from satellites than about the lower layers near the earth from ground observations.

The Tiros II satellite just launched is expected to supply cloud cover pictures by television for experimental daily weather forecasts.

Teams of meteorologists will study cloud distribution and try to spot storm centers and weather fronts. Information gathered by the teams will be sent to the national weather center in Washington, D. C.

When the planned Nimbus weather satellite is launched, the weather data from the higher layers of the atmosphere will increase even more rapidly.

It is now necessary to expand the network for weather information on earth to keep pace with the information gathered by satellites and calculated very rapidly by computers, Mr. Showalter said.

He recommended that meteorologists work out a plan to expand the data-gathering network and make it more effective, considering both economic aspects and what is useful information.

Two ways to improve the data network are to increase the number of weather stations and to select air samples so that no useless or repetitive information is taken.

At the present time, the Weather Bureau has stations about 200 miles apart. To increase them so they are only 100 miles apart would require four times as many stations, Mr. Showalter said.

Most air samplings are now taken over the continents and far more are made in the Northern than in the Southern Hemisphere.

Weather information from over the oceans is necessary to get earth's complete weather picture. Mr. Showalter urged that air samplings over the oceans be increased.

• Science News Letter, 78:355 December 3, 1960

ABOVE THE SNOWS OF KILIMANJARO—The British Royal Air Force's newest aerobatic team of Hawker Hunter aircraft goes into a loop at dawn over 19,265-foot Kilimanjaro, Africa's highest mountain. The team is based near Nairobi, capital of Kenya.

BIOLOGY

Living Organisms Recovered From Space

➤ LIVING ORGANISMS have been recovered from the Discoverer XVII satellite after orbiting the earth 31 times.

Algae, human tissue culture, and a radiation photographic plate sped through space at altitudes as high as 615 miles from earth. The biopack was cushioned in a three-pound aluminum capsule built by Lockheed for the Air Force School of Aviation Medicine, Brooks Air Force Base, San Antonio, Texas. It was included in the Discoverer on a "space available" basis.

The biological experiment is part of a continuing study of the effect of space environment on living organisms that have been planned for the Discoverer series. Such experiments had been included in previous Discoverer shots, but this was the first to be recovered.

The sliver of human tissue in the culture medium and the algae will be examined by researchers at the School of Aviation Medicine to see what effects weightlessness, cosmic radiation, and launch and recovery may have produced. The radiation photographic plate is part of the study by the Cambridge Research Center to measure and identify radiation in a space cabin environment.

• Science News Letter, 78:355 December 3, 1960

SEVEN INTO SPACE

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METEOROLOGY

Ideal Weather Service Of Future Described

➤ HOW THE IDEAL weather service of the future could work was reported by Prof. Morris Neiburger, chairman of the meteorology department at the University of California, Los Angeles.

He emphasized that this ideal was "many years, many research projects and many experiments away."

Dr. Neiburger foresees a group of satellites skimming above the atmosphere, radioing back reports from which ground stations deduce temperatures, humidity and ozone content at various atmospheric levels.

Other satellites, 22,000 miles above sea level, move around the equator at the earth's rotating speed, continuously monitoring large areas of the earth. Two stations, one on the moon and the other on the opposite side of the earth, observe the total radiation emitted by the earth and cloud cover.

Reports from satellites and from automatic observation stations on the ground are collected at computer centers. The centers, in turn, release predictions on world-wide atmospheric circulation patterns and compute and correct global weather forecasts for weeks, months and even years ahead.

At regional centers, computers automatically digest the world-wide forecasts and deduce specific temperature, precipitation and wind forecasts for their areas. Flight forecasting centers compute weather conditions from take-off to landing for all planes.

A communication network services industrial firms, newspapers and television stations with weather information. Any citizen can get up-to-the-minute forecasts by dialing on his telephone.

• Science News Letter, 78:356 December 3, 1960

ROCKETS AND MISSILES

Space Capsules on Show At National Air Museum

➤ SPACE CAPSULES have joined the other historic Space Age "relics" now on display at the Smithsonian Institution's National Air Museum.

The capsules, used last May 28, in the nation's first successful rocket launching and recovery of animal life from outer space, were presented to the Museum by the Army.

They are the cradles that carried monkeys Able and Baker on a 1,500-mile Jupiter rocket flight, during which the animals experienced nine minutes of weightlessness and nearly 40 g's, or 40 times the normal force of gravity, without harm.

Able, who later died from causes not induced by the history-making flight, is preserved and mounted in the Air Museum display in the original cradle in which she made her flight. Baker is still alive and well.

The flight of the monkeys covered 2,000 "space miles" at a maximum altitude of about 300 miles, with a peak velocity of 10,000 miles per hour. During the flight, the monkeys rested in special contoured fibreglass beds in a semisupine position during the launch phase, in much the same physical position the Project Mercury astronauts will assume in their flights and orbits.

Philip S. Hopkins, director of the National Air Museum, commenting on this latest addition to the Museum's rapidly growing Space Flight Collection, observed that "This historic ascension, forerunner of manned space flight, is an example of history repeating itself. In 1783, before man's first ascent into the air in free flight in a Montgolfier Balloon, a duck, a sheep, and a rooster were sent aloft for experiment. Similarly today, before the first astronaut accomplishes human space flight, the monkeys Able and Baker have safely preceded him. We consider this a truly significant specimen in the history of flight."

• Science News Letter, 78:356 December 3, 1960

SCIENCE NEWS LETTER

VOL. 78 DECEMBER 3, 1960 NO. 23

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D. C., NOrth 7-2255. Cable Address: SCIENSERVC.

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Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulation.

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MEDICINE

Asthma Clue From Horses

➤ RESEARCH INTO the deaths of thoroughbred horses, especially foals, has produced an entirely new approach to the treatment of asthma, hay fever and skin troubles in human beings.

Dr. W. R. Wooldridge, scientific director, Equine Research Station of the Animal Health Trust, Newmarket, England, said the new approach was so promising that the British Medical Research Council and the Medical Research Development Council are cooperating in its further development.

During the course of the investigation on horses, a substance was found in certain white cells in the horses' blood that played an active part in the control of histamine, frequently the cause of surgical and accidental shock, skin lesions of the nettle rash type and such allergies as asthma and hay fever.

"Most of the allergy conditions in humans and in animals are caused by excess production of histamine in the body," Dr. Wooldridge said.

Earlier research work has shown that the effects of this excess were automatically reduced in the presence of white blood cells (leucocytes) known as eosinophils. This suggested that injections of eosinophils might be used to combat histamine, provided that means could be found to separate live cells from the blood stream.

This process is extremely difficult because all cells normally die rapidly on removal from the body.

After more than a year of work, the Equine Research Station developed a technique by which eosinophils, alive and normal in all respects, could be recovered from the blood in a high degree of purity.

It is now possible to make an extract of eosinophil leucocytes containing a substance proved to be more powerfully antihistaminic and anti-inflammatory than any so far discovered.

The veterinary and medical scientists are now cooperating to isolate, identify and produce the mysterious substance.

• Science News Letter, 78:357 December 3, 1960

MEDICINE

Unfelt Heart Attacks

➤ AN ESTIMATED 10% to 15% of heart attacks among urban, middle-aged men occur without causing any signs of distress, four Chicago doctors report.

Their estimate is based on three cases of heart attack found among 20 middle-aged men who did not have any distress.

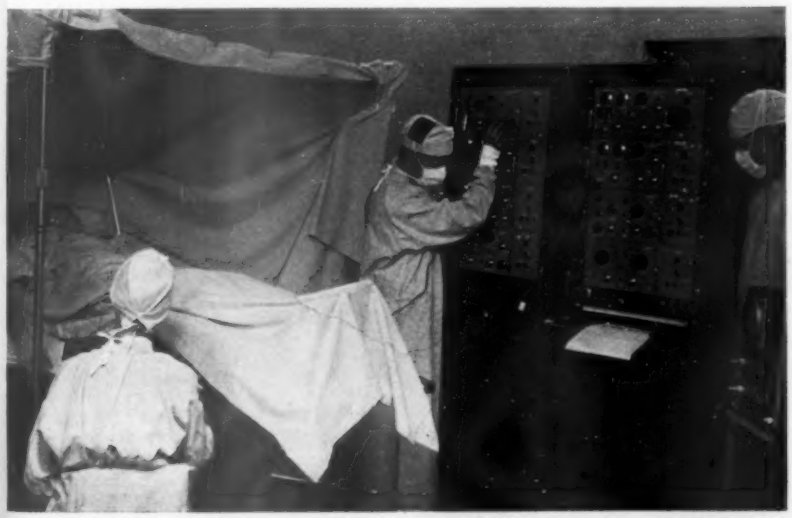
In a comprehensive study of 756 medical case records of a Chicago utility corporation's employees during a four-year period, 41 new cases of coronary heart disease of all types were diagnosed. Of these, 20 definite cases of myocardial infarction were verified by electrocardiograph, but three, or 15%, were without symptoms. A total of 756 men from 50 to 59 years of age were studied, of whom 667 had no evidence of heart disease.

Drs. H. A. Lindberg, D. M. Berkson, J. Stamler and A. Poindexter, all of Chicago, report their study in the American Medical Association's Archives of Internal Medicine, 5:629, 1960. They made the investigation with the cooperation of the Chicago Board of Health, the Heart Disease Control Program and the Department of Medicine, Northwestern University.

Autopsies have previously shown "silent," painless or unsuspected cases of myocardial infarction that have escaped detection but the physicians said there are few reports describing totally asymptomatic cases during life.

They said that routine periodic electrocardiography would uncover "a significant number of cases which would otherwise go unrecognized." This is particularly important at the present time among adult men, they reported, when effective "secondary prevention of coronary heart disease may be a real possibility."

• Science News Letter, 78:357 December 3, 1960



CHANGES IN TREMOR MEASURED MOMENT-BY-MOMENT

VETERINARY MEDICINE

Dwarf Cattle Inherit Metabolic Disorder

➤ "SNORTER" DWARFISM, which is a major problem among cattle breeders, is probably an inherited disorder, Dr. Andrew E. Lorincz, University of Florida College of Medicine, Gainesville, reported at a New York Academy of Sciences meeting in New York.

Dr. Lorincz said this was the first known inherited disorder of metabolism in animals.

Only within the past ten years, Dr. Lorincz reported, "have hereditary disorders of connective tissue acid mucopolysaccharides, which are complex organic chemical compounds, been recognized.

The first such disorder in humans was recognized through autopsy specimens of patients with the Hurler syndrome, which is a fat disturbance involving the cartilage, bones, tissues under the skin, the brain, cornea, liver and spleen.

Dr. Lorincz reported information showing similar findings in two other inherited disorders in man involving bone deformities, begun in childhood when active growth occurs.

He also reported information showing excessive accumulation of acid mucopolysaccharide in the livers of snorter dwarf cattle.

• Science News Letter, 78:357 December 3, 1960

MEDICINE

New Monitoring Device Used During Surgery

➤ A MONITORING DEVICE has been developed at Northwestern University Medical School, Chicago, for measuring moment-by-moment changes in tremor during surgery for Parkinson's disease, also called "shaking palsy." The device utilizes an instrument originally developed for testing aerodynamic surface vibration in airplane wings and guided missiles.

Reporting on the technique at the Chicago Neurological Society were Drs. Joel Brumlik, Nicholas Wetzel, Benjamin Boshes, with Mathew Petrovick, electronic engineer who devised the instrumentation technique.

• Science News Letter, 78:357 December 3, 1960

ANTHROPOLGY

Tools Tell of Evolution

➤ THE TOOLS early man left behind him tell scientists more about man's evolution than do his bones, the American Anthropological Society was told in Minneapolis, Minn.

Dr. Leo A. Estel of Ohio State University reported that the most important developments in man's evolution can be found from his cultural remains and by ethnological observations.

The brain, not the bones, is the most important factor in human evolution, he said.

The broad outlines of the evolution of man's skeleton are well known. They fit with what is known of the evolution of apes. However, the evolution of the important soft tissues of humans is less well known, and that of the central nervous system and the brain, except roughly for size and configuration, is not known. A long-dead skull does not reveal much about the brain once housed in it.

• Science News Letter, 78:358 December 3, 1960

Depends on Affection

➤ IN ORDER for a monkey to develop a satisfying sexual relationship as an adult, it is necessary for him to have developed, in early infancy, normal, non-sexual affection for another infant monkey, Dr. Harry F. Harlow, University of Wisconsin psychologist, told the American Anthropological Association meeting in Minneapolis, Minn.

One monkey does not learn affection for another baby by generalization from his love for his mother, Dr. Harlow said. The first stage of a baby's affection for another baby is just a matter of propinquity, he said.

For the first month of life, a monkey is interested in exploration of the inanimate world. But when he is one month old, he will become curious about another living baby. Very soon he is romping with him and, especially if the baby is a male, he is engaged in rough-and-tumble play, Dr. Harlow reported.

• Science News Letter, 78:358 December 3, 1960

PSYCHOLOGY

Describe Antarctic Rigors

➤ INTELLIGENCE, education and age have proved important factors in the emotional stresses encountered in life at an Australian Antarctic station. But these have not proved similarly significant in American bases.

In the Australian experience, they are a vital factor in stressful situations that may arise in the frozen continent, Philip Law, director of the Antarctic Division of External Affairs in Australia, reports.

"All our experience underlines the basic importance of intelligence and education, and much trouble at a station is avoided if men can be chosen who have a reasonable measure of both," Mr. Law says.

Such men are more flexible and are not easily bored. Consequently, they are more self-sufficient, and, in Mr. Law's experience, "they have the sense to analyze situations and to use their minds to control their reactions." Although he does not draw a line regarding age, he observes that it is unusual for a man past 40 to possess the necessary physical drive and energy.

The Australian Antarctic authority also makes the point that in his experience serious breakdowns in the Antarctic occur mostly in young men less than 25 years of age. The worst cases of mental disturbance apparently occurred within from two to eight weeks of the departure of the relief ship that landed the men.

"Apparently the impact of the environment is immediate and severe," Mr. Law notes in Discovery, Oct. 1960.

American Antarctic authorities agree that the impact of the environment tends to be immediate. A lower ebb in general morale occurs upon arrival in Antarctica and often continues while the relief ship still is at the base.

Morale tends to improve, however, when the Antarctic worker begins to take on his assigned responsibility after the ship leaves, Dr. Albert P. Crary, chief scientist for the U. S. Antarctic Research Program, told SCIENCE SERVICE.

There have been no breakdowns in the American experience in Antarctic. Dr. Crary discounted both age, intelligence and experience in themselves as significant in ability to withstand stress of a remote, cold and harsh environment.

"Maturity cannot always be measured by age," Dr. Crary said. "Nor is experience necessarily an assurance of good adjustment," Dr. Crary said, warning against generalizations.

He noted that some of his most proved colleagues in the Antarctic have been young men, recent college graduates, with no experience.

"However, some men of experience always are desirable," he said.

It happens that most of the "experienced men" in the U. S. Antarctic program are well past the age 40. Soviet Antarctic scientists and workers may range in age from later 20's to well past 40; so age, apparently, is not a factor in their choice of Antarctic personnel.

"It is more important to have the man and job well matched than choose men of certain age, training or experience," Dr. Crary declared.

After selection on the basis of job needs and requirements, U. S. Antarctic candidates are sent to the U. S. Navy Hospital, Bethesda, Md., for a complete physical and psychological examination. Dr. Crary attributes the absence of mental breakdowns among U. S. Antarctic personnel to this careful screening.

Also, men on U. S. bases are not as isolated as those on Australian bases. Planes can make contact from October to March; and during the few months of wintering over, there is frequent and regular radio communication with family and friends in the United States through "ham" radio operators and the Red Cross.

• Science News Letter, 78:358 December 3, 1960

ARCHAEOLOGY

The Reign of Abimelech Placed Near 1150 B.C.

See Front Cover

➤ THE DATE of the reign of the Biblical Abimelech, Israel's first king, has been fixed at around 1150 B.C.

In ruins of the temple of Shechem, ancient capital of Israel, archaeologists uncovered fragments typical of 12th century B.C. Hebrew unpainted pottery, from which they determined the date. A great sacred stone, seen on top of the wall on the cover of this week's SCIENCE NEWS LETTER, is now restored by archaeologists to the spot where it once stood in the courtyard of the temple.

Abimelech destroyed the temple during a revolution that occurred three years after he had established himself as ruler. In the remains of ancient houses built successively on the same site, pottery fragments, coins, jewelry and other objects were found.

From them the archaeologists have not only learned more about daily life in Shechem but have been able to construct an accurate dating scheme covering the important period from the time of Alexander the Great to 50 years after the death of Christ.

Scholars from Drew University, McCormick Theological Seminary, Harvard Divinity School and seven other American educational institutions probed the ruins of Shechem for three summers. It is the largest American archaeological project in the Holy Land.

• Science News Letter, 78:358 December 3, 1960

GENERAL SCIENCE

Value of Scientific Papers Measured

➤ HOW TO MEASURE the importance of a scientific paper will be investigated during the coming year by a team of scientists at the Case Institute of Technology in Cleveland.

The project is part of an attempt to solve a major problem confronting American science, that of improving the spread of scientific information in order to speed research.

The scientists will analyze articles published in various scientific fields since 1900, and try to identify the distinguishing characteristics of a quality article. In the past, Case scientists have demonstrated that chemists spend much more time communicating than they do in research in the laboratory.

• Science News Letter, 78:358 December 3, 1960

TECHNOLOGY

How to Make "Brains" Talk

➤ THERE SEEMS TO BE one big problem the giant electronic "brains" cannot solve for themselves: how to talk with one another. But their builders, the big electronic and automation corporations, appear ready to standardize the brains' language or in some other manner let the brains work and talk together.

By making the brains compatible, the companies hope to make automation cheaper.

The problem: one company's brain thinks differently from another's. They use different systems of calculation.

Thus, if a company has a lot of International Business Machines Corporation equipment, it can not readily buy and use Sperry-Rand improvements, or vice versa.

And if one government agency with one kind of equipment seeks to use data from another agency with a competing kind of equipment. the conversion may be tough or downright impossible.

This kind of inefficiency is expensive. If the machines can be standardized, the result will be a saving of millions of dollars annually by customers, Alfred J. Ball, president of the Office Equipment Manufacturers Institute in Washington, D. C., believes.

Dr. Joseph W. Barker, consultant in New York to OEMI's new X-3 committee on data processing standardization, said in an interview that the standardization will lower the cost of automation. But he said standardization had pitfalls.

"We must standardize without blocking technological development."

Twenty-four manufacturers of automation equipment are cooperating in the standardization venture.

Some of these companies' machines can work with each other now, via translating devices called transverters. Dr. Barker feels that improved and standardized transverters may turn out to be the fullest solution possible.

But ultimately, Dr. Barker hopes, standardization will permit data processing machines made by different companies to be hooked up and worked in concert via telephone lines.

• Science News Letter, 78:359 December 3, 1960

PHYSICS

Low Temperature Component Developed

➤ A SIMPLY CONSTRUCTED device for use in low-temperature electronic circuits has been developed.

The new device, called a tunneltron, may extend the range of low-temperature, or cryogenic, instruments to include low-noise amplifiers, high-frequency oscillators and computer components.

Physicists working at Arthur D. Little, Inc., Cambridge, Mass., observed an unexpected "switch-back action" or negative resistance region when current was passed through a metal-dielectric-metal sandwich at temperatures approaching absolute zero, or 459.7 degrees below zero Fahrenheit. The resistance effect stems from the ability of electrons to pierce or "tunnel" through extremely thin layers, about a millionth of an inch thick, of material normally considered to be insulating.

The tunneltron is based on the principle of using a changing magnetic field to control the tendency of certain metals to lose electrical resistance at low temperatures. Dr. James Nicol, Dr. Sidney Shapiro and Paul H. Smith reported their work in the Physical Review Letters, 5:461, 1960.

• Science News Letter, 78:359 December 3, 1960

PHYSICS

Atomic Vibrations Cool Refrigerators

➤ A NEW WAY of studying atomic vibrations important to the average household was reported to the National Academy of Sciences meeting at the University of Pennsylvania in Philadelphia.

These are atomic vibrations that interact with electrons. Not all of them do; but those moving with the electrons are responsible for the functioning of such household items as electric heaters, the conventional light bulb and the refrigerator.

The interacting vibrations also are the major cause of the resistance of electric conductors and are behind the resulting power losses encountered in long power lines.

Drs. Kurt Hubner and Nobelist William Shockley of the Shockley Transistor Unit, Palo Alto, Calif., have designed an experiment using semiconductor and transistor technology to study the waves or motions (called phonons) produced by an electric current of electrons on thin platelets of single crystal silicon in three layers.

The outer layers are treated so that they are conductive to electrons while the mid-portion forms an insulating layer between them. This makes possible a study of the electron-phonon interactions at the source, propagation medium and receiver.

Apart from the purely scientific results, the scientists reported that the practical application of their experiments makes possible a direct current transformer.

• Science News Letter, 78:359 December 3, 1960

TECHNOLOGY

Color Maps Produced By Electrostatic Printing

➤ COLORED MAPS can now be produced in less time with a new electrostatic printing machine. The heart of the process is a photoconductive coating that insulates in the dark and conducts in light when applied to paper.

The experimental machine, built by Radio Corporation of America, was developed for one-color map production at the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va.

Tests are expected to lead to a five-color electrostatic printing machine that can turn out 2,000 multicolor maps per hour.

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NEON TELEPHONE NETWORK—Telephone voices are carried through neon gas tubes that make up the "switching network" of an electronic central office developed by Bell Telephone Laboratories. The tubes are used to connect one telephone with another, a task that was earlier performed by electro-mechanical relays.

PUBLIC HEALTH

TB Can Be Eliminated Through Chemotherapy

➤ TUBERCULOSIS can be eliminated in the United States through drug treatment.

Dr. Edward T. Blomquist, chief of the tuberculosis branch, division of special health services, U. S. Public Health Service, called for coordination between public health agencies and communities to stamp out TB.

Eradication of tuberculosis means killing the tubercle bacilli in persons now suffering from the active disease and in those who previously had TB and were inadequately treated. The proper dosage of appropriate drugs, such as isoniazid, over a period of time will make it impossible to communicate the disease to others and will lessen the possibility of recurrence in the patient.

Because the death rate for tuberculosis has declined enough so that many TB hospitals have been closed, Dr. Blomquist said that the public has interpreted this situation as evidence that tuberculosis services in general can be cut back.

Public health departments are in difficulty on this account, but Dr. Blomquist said that intercounty cooperation enabling the State Health Department to work out a state plan for TB treatment might be a solution.

"The amount of direct service or financial assistance the state gives is not an issue," he said. "Any State Health Department should be able to serve in a coordinating capacity."

Dr. Blomquist's report appears in Public Health Reports, 75:1069, 1960.

• Science News Letter, 78:360 December 3, 1960

MEDICINE

Single Solution Replaces Fluids Lost After Burns

➤ A SINGLE SOLUTION can now be given intravenously to severely burned patients to replace water, salt and protein as they are lost. It is used during the first 48 hours following burns.

Drs. J. Frederick Eagle Jr. of St. Luke's Hospital, New York, and Worthington G. Schenck Jr., and Walton Shim of the Edward J. Meyer Memorial Hospital, Buffalo, report that this treatment has been used for all burn patients admitted to their hospitals during the past four to six years.

Replacement of red blood cells is also necessary, but seldom during the first 48 hours.

The solution contains 0.66% sodium chloride, two percent protein and five per cent glucose.

Of 28 patients with burns of 15% or more of the body surface treated with the single solution, the physicians report that only one died during the early dangerous period following burn. This was their oldest patient, an 80-year-old woman with a 35% body burn who developed heart failure and pulmonary embolism the second day.

The doctors said the treatment did not reduce the death rate as a number of patients died later, but reduced deaths during the first 48 hours.

The greatest asset of the treatment is that it simplifies care of burned patients. The single solution should be particularly valuable for use in disasters.

Four different solutions are usually given intravenously to severely burned patients. The single solution has the advantage of replacing blood substances at the same rate at which they are being lost.

The report appears in the Journal of the American Medical Association, 174:1589, 1960.

• Science News Letter, 78:360 December 3, 1960

IMMUNOLOGY

Live Parasite Vaccine Used in Cattle Disease

➤ A VACCINE made of weakened live parasites is being used in Great Britain to combat increasing parasitic infections in cattle. Irradiation of larvae by X-rays during the molting period weakens but does not kill the parasites.

Dr. Ernest J. L. Soulsby, University of Cambridge, England, said that a heavy dose of 60,00 roentgen units was used to weaken the larvae so that a live parasite vaccine could be made.

The tiny larvae are like minute worms, a third of a millimeter in length and one-fiftieth of a millimeter across. They are collected from the excreta of infected cattle, then irradiated before being put into vaccine that is injected into healthy cattle to prevent infestation.

The vaccine is expensive, Dr. Soulsby said, but a single shot, double strength, is effective. It costs the equivalent of about $3.50 in U. S. money.

Parasitic bronchitis is especially prevalent among English cattle. This sets up an irritation leading to pneumonia and secondary infections that may be fatal.

Although it is possible to work only with animals at present on parasitic immunology, Dr. Soulsby said that not too far in the future it would have application for human beings.

In an interview preceding his lecture in Washington, D. C., which was under the auspices of the American Institute of Biological Sciences, Dr. Soulsby said there are common parasitic cross-overs between cats, dogs and humans.

• Science News Letter, 78:360 December 3, 1960

TECHNOLOGY

Electron Tube Speeds News Picture Printing

➤ A NEW ELECTRON TUBE can print three quality photographs a second from electronic signals sent over telephone or telegraph lines. The machines now used by news services take seven minutes for a single photograph. The new tube looks like a flattened TV picture tube. Paper passing against the tube picks up charges from microscopic wires to reproduce a picture. The tube is a development of the Raytheon Company.

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IN SCIEN

HORTICULTURE

Strawberry Hormone Stimulates Pea Growth

➤ STRAWBERRY PLANTS can transmit a growth-promoting hormone to pea plants by way of temporary grafts, Dr. P. A. Thompson of the Scottish Horticultural Research Institute, Dundee, Scotland, has found.

To achieve the chemical transfusion, he grafted the top part of the embryo pea seedlings to the leafstalks of mature strawberry plants.

In strawberry plants growing under long-day conditions, a substance believed to be a hormone steps up vegetative growth and inhibits flowering. Gibberellic acid will produce the same effect, when sprayed on pea plants growing under short-day conditions, and will boost the strawberry's growth even further when sprayed on that plant.

To determine whether the strawberry hormone as well as gibberellic acid could stimulate growth in pea plants, Dr. Thompson grafted the young peas to the strawberries. The two different tissues did not grow together, but there was a transfer of growth hormone from strawberry to pea.

The amount of increased growth in the grafted peas was equivalent to that produced by applying one-fiftieth of a microgram of gibberellic acid to untreated pea plants.

Spraying the strawberry hosts with gibberellic acid caused even greater growth in grafted peas.

Dr. Thompson also reports in Nature, 188:682, 1960, that if the strawberry plants were chilled before grafting, the peas grew better than when grafted to unchilled hosts. This is probably because winter chilling of strawberries acts as a "dormancy breaker" that results in a growth spurt when the plant is placed in favorable growing conditions.

• Science News Letter, 78:360 December 3, 1960

NAVIGATION

Infrared System Cuts Haze, Fails in Fog

➤ SHIPS' PILOTS can cut through smoke and haze with an infrarad light system described to an international conference on navigational aids in Washington, D. C., by Japanese researchers.

They said the infrared rays in a system called Noctovision can penetrate about 2,000 yards. A man with equipment to convert the invisible rays into a visible image could easily detect buoys and obstructions ahead.

The conference was sponsored by the U. S. Coast Guard.

• Science News Letter, 78:360 December 3, 1960

E FIELDS

PHYSIOLOGY

Nerve Reflex Damages Irradiated Bone Marrow

➤ RUSSIAN STUDIES indicate that the nervous system plays a part in damaging bone marrow soon after whole-body irradiation.

Drs. S. Ya. Rapoport and S. M. Gasanova of the USSR Academy of Sciences in Moscow reported in Biofizika that rats X-irradiated by 800 to 1,000 roentgens showed detectable early bone marrow damage only after direct irradiation of the bone marrow. Irradiation of nerves only did not produce the same effect.

Damage to bone marrow was much more severe after whole body irradiation than after irradiation of only one arm or leg. Giving drugs such as Novocain and/or atropine, which essentially paralyze part of the nervous system, cut down on damage from whole body irradiation, but not on the damage from one-extremity irradiation.

If the nerve connections to the bone marrow or the receptors of the abdominal cavity were blocked, both methods of irradiating were less damaging.

The Russian researchers conclude in a report issued by the Department of Commerce's Office of Technical Information, that "the early damages to the bone marrow following whole-body irradiation of an animal are the result of both the direct action of X-rays on the bone marrow and on the nerve reflex reactions, the initial link of which is stimulation of the receptors of the abdominal cavity."

• Science News Letter, 78:361 December 3, 1960

ASTRONAUTICS

Man-in-Space Program Wastes Money and Effort

➤ THE DRIVE to put a man into space is having a bad effect on science in both the United States and Russia, a British space expert, Dr. R. L. F. Boyd of the University of London, charged.

He said that attempting to put a man into space is a prostitution of science since the main fruits of success will be political.

Scientifically, "we are trying to run before we can walk," Dr. Boyd charged at Oxford University. The effort is costing both the United States and Russia much because the highest grade scientific manpower and resources are being diverted to the space effort from other programs of far greater immediate importance.

At present, Dr. Boyd said, experiments involving satellites and rockets require high precision in orientation and stabilization. The presence of any living creature on board makes this infinitely more difficult, if not impossible, thus severely limiting the scope of the experiment. The space and weight taken up by the occupant could, he believes, be used far more profitably by instruments.

Dr. Boyd believes the space effort is premature rather than useless. When exploration of other planets is imminent, sending a man will be more desirable than relying on such gadgets as remote controlled robots. However ingenious, robots will always be at a disadvantage due to the time taken by control signals in traveling to and from the earth.

Dr. Boyd is also on the staff of University College, London, where much of the British space exploration work, including some of the field experiments on the Woomera Rocket Range in Australia, is centered.

• Science News Letter, 78:361 December 3, 1960

TECHNOLOGY

AEC Studies Reactors For Nuclear Tanker

➤ NUCLEAR POWER is approaching the cost of conventional power for large fast ships operating on long trade routes. Capital costs for three different types of nuclear-powered ships range from 29% to 70% more than the cost of conventional powered ships, an Atomic Energy Commission study has shown. The study covered systems using a pressurized-water reactor, a boiling-water reactor with an indirect-cycle non-radioactive secondary steam characteristic, and a boiling-water reactor with a direct-cycle steam characteristic.

• Science News Letter, 78:361 December 3, 1960

MEDICINE

Anti-Coagulant Drugs Tend to Prolong Life

➤ ANTI-COAGULANT drugs prolong life and prevent further heart attacks for at least two years, a ten-year study at the University of Chicago has shown.

Dr. Richard J. Jones of the department of medicine reported the study, which involved 736 patients, to the University's Council on Medical and Biological Research in Chicago.

Also reporting progress in the field of heart research and treatment were Drs. Peter V. Moulder, associate professor of surgery, and Robert G. Page of the department of medicine. Dr. Page is also assistant dean of the division of biological sciences.

Dr. Moulder described laboratory research suggesting modification of open heart technique. He and his associates found that high oxygen concentration in heart by-pass procedures often results in increased resistance and high blood pressure in the lungs. This research emphasizes the importance of control of oxygenation of the blood and the size of the shunts produced in open heart surgery.

Dr. Page told of recent progress in studies of salt and water retention in congestive heart failure. He has been studying the effect of antagonists to the adrenal cortical hormones, particularly aldosterone. Some of these antagonists have therapeutic use, he said.

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TECHNOLOGY

Reversible Jet System To Propel New Boats

➤ A JET PROPULSION system for small speedboats that can be effectively steered in reverse has been introduced.

There is no rudder and no propeller. The system shoots a jet of water out the rear of the boat. Vanes that look like Venetian blinds can be moved to direct the jet in different directions and thus change the direction of the boat.

The manufacturer, Vanguard Industries of Cincinnati, Ohio, said the rear outlet vanes can be closed to force water down and forward and thus reverse the direction of the boat. The firm claimed the system requires less fuel than conventional engines and can be installed on any inboard powered craft.

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RADIO

Smog Layer Interrupts Radio Transmission

➤ WHEN TEMPERATURE inversion clamps an atmospheric lid over a city, high-frequency radio transmission from the ground to high-flying planes or missiles can be cut temporarily.

The inversion layer, already notorious as a major smog factor, can also interrupt contact between two land points in direct line of sight.

The findings were reported after three years of experiments by Prof. W. D. Hershberger, assistant professor Richard C. Mackey and Dr. Warren L. Flock, University of California at Los Angeles radio engineers.

In 1956, the three engineers set up a transmitter on the 24th floor of the Los Angeles City Hall and a receiver on top of the UCLA physics building, establishing a microwave path 11.4 miles long.

Transmitting at 36,000 megacycles, they found that signals came in strong and clear on smogless days. But on days with temperature inversion, signals faded, at times completely, especially when the inversion layer was below 1,000 feet and while the sun was rising.

The importance of the study lies in setting an upper frequency limit of 36,000 megacycles for radio transmission during smoggy days. Only on frequencies below 36,000 megacycles will communication be completely reliable.

Radio engineers have a very practical interest in determining this upper limit. Although they can easily penetrate the inversion layer by transmitting on lower frequencies, higher frequency transmission has an advantage. It requires a smaller receiving dish and less bulky equipment.

The experiments also showed that microwaves are a faster although more expensive means of fixing the height of an inversion layer, especially between 500 and 1,000 feet, than the present method of sending up balloons.

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TECHNOLOGY

"Thinking" Machines Take Over

Machines with "brains" are used in an ever-growing number of production operations and services. They are by now a necessity, Judy Viorst reports.

➤ WITH THE ADVENT of the "thinking" machine, people are beginning to understand how horses felt when Ford invented the Model T.

Men can still do everything a data-processing machine can do. But it takes a thousand of them working their entire lifetimes to compute what the latest electronic "brain" can do in a day.

Automation is no longer merely the most modern or money-saving way to do a job. It is becoming, in many instances, the only practical way that job can be done.

Take the airlines. Any frequent user of planes knows the maddening mixups and delays that can occur in getting a reservation. And no wonder. A person can walk into a ticket office anywhere in the country and book a seat on a Chicago-to-New York plane leaving at 3:10 p.m. on Dec. 14.

How does a ticket agent know if the seat is available? The man-handled procedure for finding out is surprisingly cumbersome.

The agent has to call a central reservation office, where the status of the plane's seats is recorded on a hugh blackboard. If there is space available, he makes the sale and informs the person in charge of inventory control, who then changes the blackboard's figures. Anyone who has ever been left holding the bag because 45 seats were sold on a 44-seat plane has found out that this system is not entirely reliable.

With more than 50,000,000 people a year currently using scheduled airlines, automation is becoming crucial to a speedy management of plane reservations. Most of the major airlines are already using special purpose computers to do the job or are planning to install them.

Automatic Reservation System

Basically the automatic reservation system consists of a boxlike device connected to a central magnetic storage drum that transmits and records flight data. By inserting a metal plate into the box and pushing a couple of buttons, the ticket agent can get swift and accurate information about seat reservations. The box is even equipped with a lamp that flashes on if the electronic brain decides that the human brain is processing the query incorrectly.

Electronic "brains" and mechanical hands are indispensable to this country's telephone system. Automatic switching equipment connects virtually all local calls. About half the telephone users in the U. S. can now dial long distance numbers directly, and there will soon be automatic handling of person to person calls as well. Message accounting tapes make it possible to record automatically the time of a call, how long it lasted, the calling number and the number called.

Without automation, the telephone system would probably break down. Even if the companies could hire enough operators—and chances are they could not—skyrocketing phone bills would drastically cut the number of users.

The United States Post Office initiated a large-scale program of automatic mail handling in 1953. It hopes someday to use machines to read addresses and direct letters to their proper pigeonholes. Men cannot move the mail fast enough—not when 65 billion pieces a year have to be processed.

Eventually the sheer quantity of mail could do what neither rain nor sleet nor snow has yet accomplished—unless the "thinking" machines take over the job.

People disagree about whether this period can be called the Automated Age. But if the strides automation has taken since the end of World War II are any measure of what can be expected in the next 10 or 15 years, a new machine revolution is on its way.

Already automation has resulted in:

Giant transfer machinery—vast complexes of steel guided by an electronic brain to perform hundreds of operations on a part without human intervention.

Electronically guided machine tools capable of doing the most delicate cutting, drilling and welding operations.

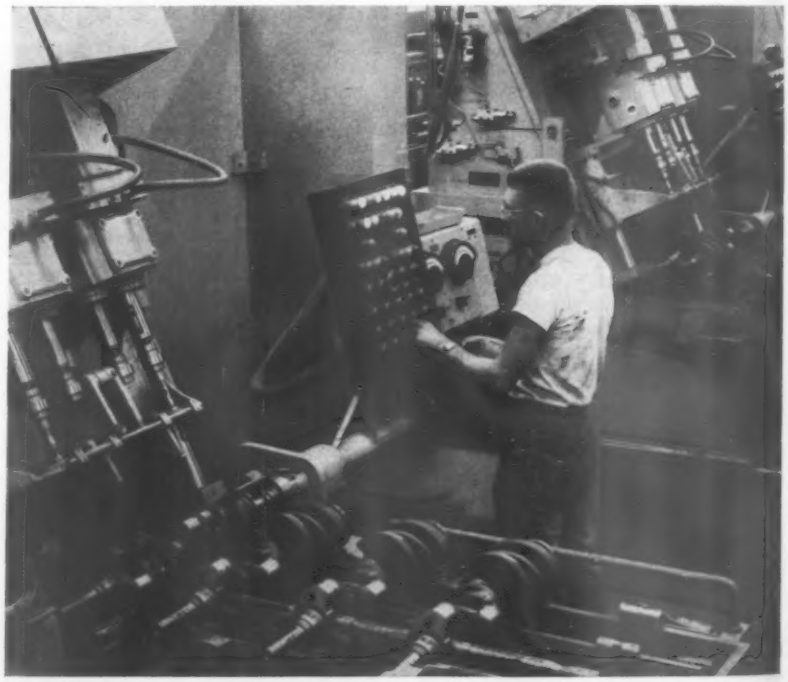
Automatic controls that measure and adjust temperature, pressure, quantity and speed of flow in any number of oil and chemical processes.

Data-processing equipment that is breaking new speed records every day computing salaries, billing insurance premium holders, tracking satellites, working out the census figures and predicting the next president.

Machines Use Their "Brains"

What is new about these machines is not their brawn but their "brains." The brawn has been around for a hundred years. But only now have people begun to use—and need—machines that do their thinking for them.

A recent cartoon showed a robot assuring a human job applicant that there was great room for advancement in his office. "After all," the robot pointed out, "only a few years ago I was just a pile of junk in the back yard."



ELECTRONIC BALANCING DEVICES—Crankshafts for automobile engines are tested on electronic balancing devices at Ford Motor Company's new engine plant in Lima, Ohio. The machine determines how much the crankshaft is out-of-balance and where the unbalance is located, then drills counterweights to give perfect balance before further operation on it.

There is no doubt that "thinking" machines will continue to have room for advancement. Like the horseless carriage, they are here to stay.

Having established themselves firmly on the scene, the machines are now challenging engineers and scientists to find new and unusual uses for their superhuman "brains."

At a conference of electronic computer experts held in Paris last year, it was pointed out that the machines are a thousand times faster than they were three years ago, and a million times faster than ten years ago. Still faster machines are being developed. These phenomenal increases in speed mean that ever larger amounts of data can be stored, manipulated, analyzed and quickly turned over to human researchers.

The University of Pittsburgh's plans for a recently acquired computer indicate the great versatility of data-processing computers.

The health laws of Pennsylvania have been codified into an electronic "library," so that any piece of health legislation can be obtained from the computer within minutes. The application of this technique to other laws, perhaps to all laws, will be studied, as well as application to other types of research.

Estimates of how much merchandise a customer will buy, and from whom and at what price, will be made by the computer. The basis of its analysis will be information fed to it about a wholesaler's salesmen and the buying habits of their customers. Business executives will be able to use the machine to test a variety of different marketing strategies.

The computer will also examine the records of more than 20,000 patients to determine whether there is a correlation between the blinding eye disease, glaucoma, and previous health history. This is just one of several medical projects using computers that are currently under way around the country.

Many experts believe that electronic brains can duplicate all of man's logical thought processes. If this is true, their potential uses are virtually limitless.

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Do You Know

A *stamp* can be removed from an envelope by applying lighter fluid to the inside of the envelope behind the stamp.

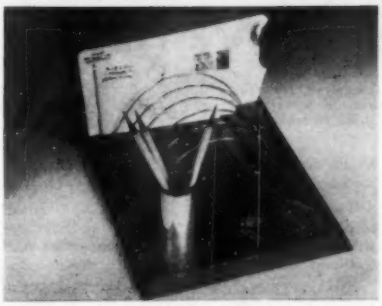
An oral *contraceptive*, approved for distribution by prescription by the U. S. Food and Drug Administration, is reported to have an anti-cancer side effect.

Over 1,000,000 *fires* in 1959 cost the nation $1,275,000,000 with 11,300 persons dead.

It has been estimated that a large metropolitan *newspaper* consumes the equivalent product of 80 acres of woodland each week.

• Science News Letter, 78:363 December 3, 1960

CHRISTMAS!



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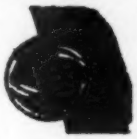

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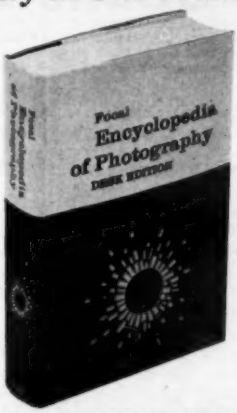

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THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC FOR THE YEAR 1962—Nautical Almanac Office, U.S. Naval Observatory—*GPO*, 514 p., $4. Issued jointly with H.M. Nautical Almanac Office, Royal Greenwich Observatory.

THE BOOK OF BIG BIRDS—Melita Hofmann—*Garden City Bks*, 56 p., illus. by author, $2.95. Informative picture book for young readers.

THE BOOK OF CHRISTMAS—Marguerite Ickis—*Dodd*, 179 p., illus., $3.50. Christmas ideas, traditions and customs from many lands.

BORON: Synthesis, Structure and Properties—J. A. Kohn, W. F. Nye and G. K. Gaule, Eds.—*Plenum Press*, 189 p., illus., $8.50. Conference proceedings dealing with crystallization, crystal growth, structure and bonding.

COMPARATIVE BIOCHEMISTRY, A Comprehensive Treatise, Vol. I: Source of Free Energy—Marcel Florkin and Harold S. Mason, Eds.—*Academic*, 590 p., illus., $18. Deals with the sources of biologically useful free energy, such as phototropism, and the distribution and evolution of visual systems.

CONCEPTS OF SPACE: The History of Theories of Space in Physics—Max Jammer, foreword by Albert Einstein—*Harper*, rev. ed., 208 p., paper, $1.40. Contains new appendix on recent experimental evidence for non-conservation of parity.

THE EDGE OF WAR—James David Atkinson, foreword by Admiral Arleigh A. Burke—*Regnery*, 318 p., $6. On the evolution of warfare and the "fusion of war and peace."

EMBRITTLEMET BY LIQUID METALS—W. Rostoker, J. M. McCaughey and H. Markus—*Reinhold*, 162 p., illus., $7.95. Reviews and evaluates published and some previously unpublished results of research in the field.

EXPLORING UNDER THE EARTH—Roy A. Gallant—*Garden City Bks*, 122 p., illus., by John Polgreen, $2.95. The story of geology and geophysics, amply illustrated, for boys and girls.

FRICTION ALL AROUND—Tillie S. Pine and Joseph Levine—*Whittlesey House*, 48 p., illus. by Bernice Myers, $2.50. Shows youngest readers many examples of friction and its results.

GREAT SHIPS AROUND THE WORLD—Penrose Scull, introd. by Frank O. Braynard—*Ziff-Davis*, 260 p., photographs, $15; before Christmas $12.50. The world's merchant marine in text and pictures.

GROWING UP WITH SCIENCE—Marianne Besser—*McGraw*, 218 p., $4.50. Based on interviews with parents of Science Talent Search winners and scientists, tells parents how to encourage science interest in their children.

THE HARVARD BRIEF DICTIONARY OF MUSIC—Willi Apel and Ralph T. Daniel—*Harvard Univ. Press*, 341 p., illus., $3.95. Compact guide to an intelligent approach to music.

THE KIRTLAND'S WARBLER—Harold Mayfield—*Cranbrook Inst. of Science*, 242 p., illus., $6. Life history study of the species, with 22-page bibliography and bird species index.

MEET THE NATIVES—M. Walter Pesman—*Pesman*, 6th rev. ed., 220 p., illus., photographs by R. C. Grout, paper, $3. An easy way to recognize Rocky Mountain wildflowers, trees and shrubs.

METABOLIC PATHWAYS, Vol. I (Second Edition of Chemical Pathways of Metabolism)—David M. Greenberg, Ed.—*Academic*, 572 p., illus., $18. Discusses advances in the field of metabolic processes of living organisms.

MODERN INSECTICIDES AND WORLD FOOD PRODUCTION—F. A. Gunther and J. R. Jeppson—*Wiley*, 284 p., illus., $8.50. General review of modern insecticides, problems of their use and problems from their use.

OXIDE CERAMICS: Physical Chemistry and Technology—Eugene Ryshkewitch—*Academic*, 472 p., illus., $16. Deals principally with ceramics of single phase oxide systems.

THE PLANT KINGDOM—Harold C. Bold—*Prentice-Hall*, 114 p., illus., $2.95; paper $1.50. Orderly view of the diversity and common attributes of plants, from algae through the flowering plants.

PLANT PHYSIOLOGY, A Treatise, Vol. 1 B: Photosynthesis and Chemosynthesis—F. C. Steward, Ed.—*Academic*, 348 p., $12. Reference work for advanced students and research workers.

PROJECT IDEAS FOR YOUNG SCIENTISTS—John K. Taylor, Ed., with Phoebe Knipling and Falconer Smith—*Jr. Bd. on Science Education*, 142 p., paper, $1.25. Compilation of suggestions for science projects.

READABLE RELATIVITY—Clement V. Durell, foreword by Freeman J. Dyson—*Harper*, 146 p., illus., paper, $1.25. Originally published in London, in 1926.

THE ROCKEFELLER FOUNDATION ANNUAL REPORT 1959: The President's Review—Dean Rusk—*Rockefeller Foundation*, 77 p., illus., single copies free upon request direct to publisher, 111 W. 50th St., New York 20, N. Y. Describes significant projects supported by Foundation's grants.

RUSSIA'S ROCKETS AND MISSILES—Albert Parry, introd. by Willy Ley—*Doubleday*, 382 p., $4.95. Reports on Russia's progress in rocketry, based on information from Russian sources.

THE SCIENCE OF MECHANICS: A Critical and Historical Account of Its Development—Ernst Mach, transl. from German by Thomas J. McCormack, new introd. by Karl Menger—*Open Court Pub. Co.*, 6th ed., 634 p., illus., $6; paper $2.45. Classic study, first published in 1893.

WAVES IN LAYERED MEDIA—Leonid M. Brekhovskikh, transl. from Russian by David Lieberman, Robert T. Beyer, Ed.—*Academic*, 561 p. $16. On the theory of propagation of elastic and electromagnetic waves in layered media.

• Science News Letter, 78:364 December 3, 1960

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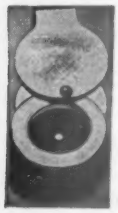

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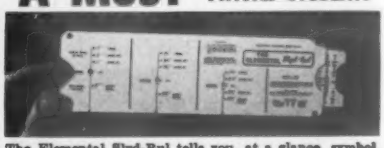

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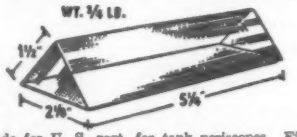

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➤ THE LIFE of a shrimp egg can be destroyed if its tissues are hit by a single 160 million-electron volt oxygen ion, two Yale University scientists report.

Drs. Franklin Hutchinson and Stephen S. Easter Jr., Yale biophysics department, report in Science, 132:1311, 1960, that the shrimp eggs showed typical decrease in hatching ability when irradiated with gamma radiation in a high vacuum.

The eggs withstood low doses of gamma radiation. However, the eggs could not survive the passage of a single energetic oxygen ion.

The scientists conclude that there is no threshold for toleration of heavy ions from cosmic radiation in space, as has been thought previously.

• Science News Letter, 78:366 December 3, 1960

Questions

HORTICULTURE—What effect did gibberellic acid have on pea grafts when sprayed on host plants? p. 360.

MEDICINE—What is the cause of most allergy conditions in humans and animals? p. 357.

METEOROLOGY—How far apart are U. S. weather stations at the present? p. 355.

Photographs: Cover, Harvard University; p. 355, British Information Services; p. 357, Northwestern University; p. 359, Bell Telephone Laboratories; p. 362, Ford Motor Co. p. 368, Burgess Vibrocrafters, Inc.

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Kodak reports on:

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Inverse squares are square

Christmas is coming, a time when one can quit being obnoxiously logical about all things, a time of fun and acquisition for kin and self. Maybe the family needs a new camera. Cameras nowadays must be automatic. A non-automatic camera suggests lack of respect for progress.

The *Kodak Motormatic 35 Camera* is the most automatic of automatics. Energy for advancing the film and cocking the shutter for ten pictures is supplied from a spring wound in loading the camera. You can fire all ten in ten seconds, then rewind the spring and fire off ten more. Not only is the *f*/number photoelectrically set for ASA Indices of 10 to 800 and shutter speeds from 1/40 to 1/250, but for flash the act of focusing adjusts the opening to the guide number. There is no need to trouble the little woman with the law of inverse squares.

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New recipe

Polyester in sheeting means strength with thinness. Chemically it means a polymer condensed from alternating units of dibasic acid, usually terephthalic, and a glycol, usually ethylene glycol until we went to cyclohexane dimethanol in Kodel Polyester Fiber.

With the switch, some isophthalic acid added to the recipe, and six years of cleaning up details, there emerges a polyester resin that keeps its dielectric constant really constant up to 130° C, which could not be said of earlier polyester. Its dissipation factor is 0.3% at 100° C, where the old ran to 1.2%. Since it also better resists humidity, acid, and bases, it is excellent for insulation and frozen food wraps. As a capacitor film at 2000 v/mil, it outlasts the old 8 to 1.

Eastman Chemical Products, Inc., our subsidiary, sells the resin. Acme Backing Corporation, Canal and Ludlow Streets, Stamford, Conn., turns it to what others call film and we (for whom "film" has another meaning) call sheeting. Acme will gladly expatiate.

Color fancily repackaged

"You press the button, it does (or in an alternate version, "we do") the rest." It was one of the more successful slogans in advertising history. It made us a great deal of money. Millions bought the philosophy, and millions still buy it. A few hundred thousand don't buy it. Them, too, we love, admire, and respect. We have just published a fancy new book for them. Fancy is the word.

This book contains more than just pages. Snuggled among them are an actual standard color negative and positive, two special slide-rule computers, and a big nomograph in color about color correction. One of the pages has windows fitted with six different color-print viewing filters. Under the title "Kodak Color Dataguide," it is sold by camera shops for $4.95. (If you send a check to Eastman Kodak Company, Sales Service Division, Rochester 4, N. Y., we shall sigh at how people have forgotten how to walk these days and mail you a copy.)

Frightening as it looks, the book contains virtually no photographic theory. It is a repackaging of operating instructions for two basic categories of users (a better word in this case than "readers"):

1) The professional, be he photographer, scientist, or something in between.

Commercial color labs in many cities do slick work in making color prints or transparencies from exposed film. But when requirements are too specialized to convey to labs geared for production, the hard way may be the better way.

2) The dedicated amateur who might be painting in oils or water-colors if only he had a better hand for it and who finds that serious color photography brings into play the exact combination of technology and a good eye that best unwinds him from workaday cares.

In art, the best effects often come from a skillful violation of the rules. But the result is usually a mess unless one has first perfected himself in the rules.

Too conservative

Only conservatives sit on committees that formulate standards for specifying film speeds. They set their lips in thin lines when they overhear enthusiasts trying to top each other with speed numbers. In the '40s they fixed the enthusiasts for fair. They defined the index so as to result in 2½ times the least exposure that even a stern judge would already have to accept as producing negatives of the highest pictorial quality.

They now confess that they leaned over backward too far for minimum grain and maximum sharpness from modern black-and-white films, modern practices, and modern equipment. The following speed numbers are derived from the revised American Standard:

KODAK PANCHROMATIC FILMS

Sheet Films	ASA
Panatomic-X	64
Portrait Panchromatic	125
Super-XX Panchromatic	200
Super Panchro-Press, Type B	250
Tri-X Panchromatic	400
Royal Pan	400
Royal-X Pan	1250
Roll Films	**ASA**
Panatomic-X	40
Verichrome Pan	125
Plus-X Pan Professional	160
Tri-X Pan	400
Royal-X Pan	1250
35mm Films	**ASA**
Panatomic-X	40
Plus-X Pan	160
Plus-X Portrait	160
Tri-X Pan	400

Note that only one figure is given for each film because most meter cells have about the same spectral response as panchromatic film. Two are needed for:

Kodak Blue-Sensitive and Orthochromatic Sheet Films	ASA Daylight	Tungsten
Commercial	50	16
Commercial Ortho	80	25
Super Speed Ortho Portrait	125	64
Royal Ortho	400	250

Prices subject to change without notice.

Kodak

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1068. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

ODORLESS MARKING APPLICATOR is guaranteed to be completely free of any annoying or contaminating odor. It dries instantly on porous surfaces and is smudge-proof, waterproof and indelible on any surface. The chisel-edged felt-nib permits broad or fine strokes. The marker is guaranteed for 49,000 inches of writing.

• Science News Letter, 78:368 December 3, 1960

CANDLE ADAPTER firmly secures a candle in the holder regardless of difference in size of candlestick hole and candle. The reusable "candle stabilizers" are small, white, felt-like discs, 1½ inches in diameter, and come 24 to a package.

• Science News Letter, 78:368 December 3, 1960

METAL WINDOW EASE is a liquid that makes metal windows easy to open and close. It comes in a plastic squeeze dispenser and works equally well in hot or cold weather, leaving no residue. The liquid is odorless, non-flammable, harmless and stainless.

• Science News Letter, 78:368 December 3, 1960

CORDLESS ELECTRIC CARVER, shown in the photograph, makes carving a fowl or roast easy. The battery-powered motor is in the handle, with no cord to get in the way. The serrated stainless steel blade makes 7,200 cutting movements a minute. Set comes with carving board, batteries, easy-grip power handle, two blades (carving and slicing) and three "how-to-carve" booklets.

• Science News Letter, 78:368 December 3, 1960

SELF-POWERED "PHONE," about the size of a home movie camera, sends voice messages hundreds of yards on a beam of invisible infrared radiation. The 26-ounce unit is "aimed" like a camera at another unit and operates anywhere in line-of-sight, day or night. Powered by flashlight batteries, it provides confidential communication in crowds, regardless of noise, and is not subject to FCC regulations.

• Science News Letter, 78:368 December 3, 1960

BOWLING BAG is designed to keep bowling ball and shoes securely in place; each is fitted into a special recess. The case looks like fine luggage. Its scuff-proof, rigid sides are said to protect ball and shoes better than flexible bowling bags.

• Science News Letter, 78:368 December 3, 1960

DIAL THERMOMETER can be read as easily as a wrist watch and is unbreakable. Imported from Switzerland, the stainless steel thermometer accurately records oral or rectal body temperature on an easy-to-read dial face. It is unnecessary to shake it down as a re-set button returns it to zero automatically.

• Science News Letter, 78:368 December 3, 1960

AUTOMATIC LIGHT CONTROL is a photocell in a clear, butyrate plastic case. It automatically turns outdoor post lanterns on at dusk and off at dawn. Pre-wired for easy installation, it operates within a temperature range of minus 35 degrees to 140 degrees Fahrenheit.

• Science News Letter, 78:368 December 3, 1960

Nature Ramblings

➤ EVERY BOY has to have a pocket knife. This is one of the fundamental facts and indisputable rights of growing up. A pocket knife is a boy's companion and chief tool. It is his means of poking, cutting, probing, digging and otherwise examining each day's new discoveries.

A great scientist and a great friend of boys, Dr. David Fairchild, has suggested another such indispensable tool for boyhood: a small hand lens.

Small enough to fit snugly into the corner of a crowded pocket, yet powerful enough to magnify a bee's stinger five to ten times, it is a wonder that the hand lens has not already taken its place as necessary to being all boy. It is the perfect complement of the jackknife for helping keen young minds explore the world of nature.

Under the magnifying power of a hand lens, a simple flower becomes a complex and fascinating organ. There are stamens and pistils and their parts to be discovered —perhaps for the first time. This leads to wonder, and the pocket knife comes into play. The flower is dissected and the hidden ovules are discovered in the base of the pistil. Pollen is seen for the first time as something more than a yellow powder.

A Big Look for a Small Boy

And pollen is seen on a bee's leg. Looking at a bee under the hand lens, a boy will see the many hairs and other structures whose express function is that of gathering this pollen. From the pollen-laden legs then to other parts of the insect's body: the breathing openings along the abdomen, the many mouthparts, the jointed antenna, the complex eyes.

This is the start. From here on, everything must be seen under magnification. There are a hundred plants and insects to examine. Feathers and hair will be scrutinized.

Wood whittled by the pocket knife will now be studied as to its texture and design. Particles of sand, clay and loam will become familiar, and in the boy's mind the relationship between fertility, soil structure and soil composition will take form.

The natural curiosity of youth, sharpened by an instrument that makes close observation both practical and exciting, is bound to lead to the habit of looking closely and asking questions of the natural world.

The habit may well carry over into other important phases of life. In any event, a boy with a pocket knife and a hand lens is a boy who is ready for the adventures of each day in the exciting realm of nature.

—HORACE LOFTIN

• Science News Letter, 78:368 December 3, 1960